Detailed Program

Bachelor of Technology (B.Tech.)

Computer Science Engineering (CSE)

&

CSE with Specialization in AI and ML

Semester-II

(2025-2029)

DOC202506200018

RNB GLOBAL UNIVERSITY

Educating stars for tomorrow

RNB GLOBAL UNIVERSITY

RNB Global City, Ganganagar Road, Bikaner,
Rajasthan 334601

OVERVIEW

RNB Global University follows Semester System. Accordingly, each academic year is divided into two semesters, **Odd (July-December) and Even (January-June).** Besides this, the university follows a system of continuous evaluation along with regular updating in course curricula and teaching pedagogy.

The curriculum for B.Tech Program **for (January- June) Even Semester, 2026** along with examination pattern is as follows:

Course Scheme

Semester -II

S. No.	Course Code	Course Category	Course Name	L	T	P	Credits
1.	CSEC14150	DSC-4(a)	Engineering Graphics	3	0	0	3
2.	CSEC14151	DSC-4(b)	Engineering Graphics lab	0	0	2	1
3.	CSEC14152	DSC-5	Basic Mechanical Engineering	3	0	0	3
4	BSCC15150	BSC -3	Applied Mathematics-II	3	1	0	4
5	BSCC16150	BSC -4(a)	Applied Physics-II	3	0	0	3
6	BSCC16151	BSC -4(b)	Applied Physics Lab-II	0	0	2	1
7	BSCC13150	BSC-5(a)	Applied Chemistry	3	1	0	4
8	BSCC13151	BSC-5(a)	Applied Chemistry Lab	0	0	4	2
9	AECE55000	AEC-1	Environmental Studies	3	1	0	4
10	SEC077002	SEC-2	Ability & Skill Enhancement - II	2	0	0	2
11	WHNN99000		Workshops & Seminars/ Human Values & Social Service/ NCC/ NSS	-	-	-	1
		Total		**20**	**3**	**8**	**28**

EVALUATION SCHEME- THEORY

The evaluation of the theory paper of B.Tech would be based on Internal and External Assessments. Internal Assessment would consist of 50% of the marks (50 marks) and external assessment (in form of End Term Exam) would consist of remaining 50% marks (50 marks). Detailed scheme of Internal and External Assessments as follows:

Internal Assessment

The distribution of Internal Assessment Marks is as follows

Type	Details	Marks
Mid Term	One Mid-term Sessional	25
Quiz	Quiz based on MCQs	5
Marks obtained in various Tests, Assignments, Presentations, Tutorials etc.	Average of Marks obtained	15
Academic Performance including Attendance	Eligibility >75% Attendance	5
TOTAL		**50**

External Assessment

Type	Marks
Theory	50

EVALUATION SCHEME -PRACTICAL

The evaluation of the practical paper of B.Tech would be based on Internal and External Assessments. Internal Assessment would consist of 50% of the marks (50 marks) and external assessment (in form of End Term Exam) would consist of remaining 50% marks (50 marks). Detailed scheme of Internal and External Assessment is as follows:

Internal Assessment

Type	Details	Marks
Marks obtained in various manuals, practical file, participation, any model prepared, output of practical	Average of marks obtained	45
Academic Performance including Attendance	Eligibility >75% Attendance	5
TOTAL	**50**	

External Assessment

Type	Marks
Practical	50

EVALUATION SCHEME- NSS/NCC AND CLUB ACTIVITIES

1. NSS/NCC /Similar activities prescribed by University will be completed from Semester I –Semester VI. It will be evaluated internally by the respective institute. The credit for this will be given at the end of each Semester.

2. The students have to join club/clubs with the active participation in different activities of club. The students would be continuously assessed from Semester I – Semester VI and credits and marks would be given at the end of each Semester.

Bachelor of Technology – CSE (Four Years Course)

1. Vision

To deliver a high-quality education that will produce engineers of the highest caliber, equipped with the newest information and cutting-edge concepts in computer science engineering to fulfil the demands of industry and society.

2. Mission

To create an academic setting for the growth of professionals equipped with the knowledge, abilities, values, and self-assurance to assume leadership positions in the field of computer science and engineering.

To promote a culture of research that produces knowledge and cutting-edge technologies that aid in the society's sustainable development.

To improve academic collaborations for international exposure.

3. PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEO1: To produce studentswith strong foundation of knowledge and skills in the field of computer science and engineering.

PEO2: To produce students who are employable in private/public sector/research organizations or work as an entrepreneur.

PEO3: To produce students who can provide solutions to problems in their profession by applying computer engineering theory and practices.

PEO4: To produce graduates who can provide leadership and are effective in multidisciplinary environment.

4. PROGRAMME OUTCOMES (POs)

Engineering Graduates will be able to:

PO1: Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2: Problem Analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.

PO3: Design/Development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitation.

PO6: The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7: Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11: Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12: Life-long learning: Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

5. PROGRAMME SPECIFIC OUTCOMES (PSOs)

PSO1: The ability to understand, analyze and develop computer programs in the areas related to algorithms, system software, multimedia, web design, big data analytics and networking for efficient design of computer-based systems of varying complexity.

PSO2: The ability to employ modern computer languages, environments, and platforms in creating innovative career paths to be an entrepreneur and a zest for higher studies/employability in the field of Computer Science & Engineering.

PSO3: Cultivate the field of computing and its latest trends, to pursue teaching, research & development activities and to work effectively in a team.

6. Course Outcomes		
Course Codes & Course Names	**After completion of these courses' students should be able to**	
BSCC15150-Applied Mathematics-II	**CO1:**	Define the basic definition and properties of partial differentiation of functions of several variables and to learn to use this to solve problems related to maxima and minima.
	CO2:	Define and find the solution of constant coefficient differential equations.
	CO3:	Explain the notion of convergence of numerical sequences and series and learn ways of testing convergence.
	CO4:	Make use of the basic results about the properties of Fourier transform and Fourier series and its convergence.
	CO5:	Apply coefficient differential equations to solve various problems.
BSCC16150-Applied Physics-II	**CO1:**	Define Fiber Optics and Holography Technology.
	CO2:	Explain the basic definition and properties of Insulators, Semiconductors and Conductors.
	CO3:	Make use of the properties of superconducting materials and super-conductor with Josephson theory.
	CO4:	Distinguish the Atomic & Nuclear Physics.
	CO5:	Create experiment on Holography Technology.
BSCC16151-Applied Physics Lab-II	**CO1:**	Explain the Newton's Ring principles.
	CO2:	Illustrate the nature of experimental errors and practical means to estimate errors in acquired data.
	CO3:	Apply theoretical principles of modern physics to analysis and measurements performed in the laboratory.
	CO4:	Plan the experiments related to the subject and apply the practical knowledge in industrial applications and for developing or modifying methods.
	CO5:	Create experiment on Holography Technology.
CSEC14150-Engineering Graphics	**CO1:**	Explain the writing skills, use ability in legible writing letters and numbers.
	CO2:	Make use of basic sketching techniques and instrumental drawing.
	CO3:	Apply orthographic projections of different objects irrespective of number of dimensions and to develop pictorial views.
	CO4:	Analyse the practice and standards in technical drawing.
	CO5:	Able to create instrumental drawings.
CSEC14151-	**CO1:**	Classify an engineering artifact.

Engineering Graphics Lab	**CO2:**	Build the design idea/concept graphically.
	CO3:	Explain and interpret 2D drawings.
	CO4:	Develop parametric design and the conventions of formal engineering drawing.
	CO5:	Able to create instrumental drawing.
BSCC13150-Applied Chemistry	**CO1:**	Illustrate basic knowledge in water analysis and suitable water treatment method.
	CO2:	Identify an idea on the type of polymers to be used in engineering applications.
	CO3:	Build the awareness about new materials.
	CO4:	Create the knowledge on the effects of corrosion and protection methods will help the young minds to choose proper metal / alloys and also to create a design that has good corrosion control.
	CO5:	Evaluate the water quality by using water treatment method.
BSCC13151-Applied Chemistry Lab	**CO1:**	Explain the EDTA method.
	CO2:	Plan to get some good training in accurate and precise data collection.
	CO3:	Apply the experiments related to the subject and applies the practical knowledge in industrial applications and for developing or modifying methods.
	CO4:	Create methodology to control the corrosion.
	CO5:	Evaluate the water quality by using water treatment method.
CSEC14152-Basic Mechanical Engineering	**CO1:**	Illustrate the scope of engineering, especially Mechanical Engineering and its impact on society.
	CO2:	Explain the different fields of applications of Mechanical Engineering and its interrelationship with other fields of science and engineering.
	CO3:	Identify heat, work, internal energy, enthalpy for flow & non flow process using Firstand Second Law of Thermodynamics.
	CO4:	Interpret behavior of pure substances and its applications to practical problems.
	CO5:	Evaluate the pure substance by the different applications.
AECE55000-Environmental Studies	**CO1:**	Tell different ecosystems, natural resources and environmental pollution.
	CO2:	Summarize biodiversity and its conservation.
	CO3:	Apply the values, feelings and participation of society in protection activities of the environment.
	CO4:	Discover the use of skills in identification of natural resources and their management practices.

	CO5:	Explain different Environmental laws and policies.
SEC077002-Ability & Skill Enhancement – II	**CO1:**	Select the correct phonetic symbols for improving language
	CO2:	Operate reading and writing skills in English
	CO3:	Prepare listening and speaking skills in English
	CO4:	Focus in understanding the ethics, virtues and values
	CO5:	Aware about etiquettes and personal branding

7. CO PO Mapping

BSCC15150	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2		2	3	2	2	2		2	2	3
CO2	3		3	2	2	3	2	3			3	3
CO3	3	2	3	3	3	2	3	2		2	2	3
CO4	3		2			3	2	2			3	3
CO5		3		2	3				2	2	3	3

BSCC16150	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	2	3	2	2	2		2	2	3
CO2	3		3	2	2	3	3	3	2		3	3
CO3	3	2	3	3	3	2	3	3	3	2	2	3
CO4	2		2	2		3	2	2	3	3	3	3
CO5	3		3	3		2	3	3	2	2	2	2

BSCC16151	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	2	3	2	2	2		2	2	3
CO2	3	2	3	2	2	3	3	3	2		3	3
CO3	2	2	2	2	3	2	3	3	3	2	2	3
CO4	2		2	2		3		2	3	3	3	3
CO5	3		3	3		2		3	2	2	2	2

CSEC14150	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3		2		2		2	2		2	3
CO2	3	2	3	3	2	3	2		2	3	3	3
CO3	2		2	2		3	2	2	3	2	2	3
CO4		2	2	2	2	2			2		2	3
CO5	3	3	2	2	3	3		2	3		2	2

CSEC14151	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3		2	2	3	3		3		2		3
CO2	2	2	2		3	2		2		2	3	3
CO3	2	2	3	2	2	3		2	2	2	2	3
CO4	2		2		2			2		3	3	3
CO5	3		3		3			3		2	2	2

BSCC13150	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3		2		2			2	2		3
CO2	2	3	3		2			2		2	3	3
CO3	2					2			3	3		3
CO4	2	2		2		3			3	2		3
CO5	3	3		3		2			2	3		2

BSCC13151	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3		2		3			3	2		3
CO2	3	2	2	3		3				2		3
CO3	2	2		3	2				2		2	3
CO4		2		2		3			3	2		3
CO5	3	2	3		3		3	3	2	3	3	

CSEC14152	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3			2	3	3		3				3
CO2	3	2	3		3					2	3	3
CO3	2	2	3	2		3			2		2	3
CO4			2			3				2	3	3
CO5	2	3	2		2		2	2	3	3	2	2

AECE55000	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1		3	2	3	2	2	2			2	3	
CO2	2	2		3	3						3	2
CO3		2		2	2			2			3	
CO4	2	2	2		3			2			3	2
CO5	3	3	3		2	2	2		3	3	2	3

SEC077002	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	3		3	3		3		3	3	2
CO2	3		2	3	2	2		2		3		2
CO3	3	3			2			3	3	3		2
CO4	3	3	3	2	2	2		2		3	2	2
CO5	3	3		3		3	3	3	2		2	2

8.Curriculum

Course Name: Applied Chemistry
Course Code: BSCC13150

Objectives

- The objective of the paper is to facilitate the student with the basics of Applied Chemistry aspects that are required for his understanding of basic chemistry.

Course Outline:

Unit I: Lubrication and Lubricants Functions of lubricant, Mechanism of lubrication
Thick film, thin film and extreme pressure lubrication, classification of lubricants, Properties of lubricants (flash point, fire point, viscosity index (Numericals), Cloud and pour point, saponification value (Numericals), acid value (Numericals), iodine value (Numericals), consistency, drop point). Synthetic lubricant and Additives for lubricants.

Unit II: The Phase Rule Phase Equilibrium: Definition of various terms
Phases, components and degrees of freedom of a system, criteria of phase equilibrium; Gibbs Phase Rule and its thermodynamic derivation; Derivation of Clausius – Clapeyron equation and its importance in phase equilibria. Phase diagrams of one-component systems (water and sulphur) and two component systems involving eutectics (Lead-Silver system its application in Pattinson's process), System having congruent melting points (Zinc-magnesium system) and System having incongruent melting points (Na-K system). Applications of phase rule: Freeze drying, safety plugs, solders and freezing mixtures.

Unit III: Water Introduction and specifications of water
Hardness and its determination by EDTA method (Numericals), Alkalinity and its determination (Numericals), Boiler feed water, boiler problems– scale, sludge, priming & foaming: causes & prevention, Boiler problems– caustic embrittlement& boiler corrosion: causes & prevention, Desalination by Reverse Osmosis and Electrodialysis, Disinfection by break-point chlorination. Water Softening by Internal Treatment: carbonate & phosphate conditioning, colloidal conditioning &calgon treatment Water Softening by External Treatment: Lime-Soda Process (Numericals) Zeolite & Ion-Exchange Process.

Unit IV: Corrosion & Its Control Causes, effects & consequences

Chemical or Dry corrosion & its mechanism (Pilling-Bedworth Rule) Electrochemial or Wet Corrosion & Its mechanism, Rusting of Iron Passivity, Galvanic series, Galvanic Corrosion, Soil Corrosion Pitting Corrosion, Concentration Cell or Differential Aeration Corrosion, Stress Corrosion. Factors Influencing Corrosion: Nature of metal and nature of corroding environment; Protective measures: Galvanization, Tinning Cathodic Protection, Sacrificial Anodic protection, Prevention of Corrosion by Material selection & Design.

Unit V: Polymers and Polymerization

Organic polymers and its classification, Mechanism of polymerization: free radical, cationic, anionic and coordination polymerization, effect of structure on properties of polymers, preparation, properties and technical applications of thermo-plastic (PVC, PVA), thermosets (PF, UF), and elastomers (SBR, GR-N), Inorganic polymer: silicones, introduction to polymeric composites.

Suggested Readings:

1. Engineering Chemistry: by P. C. Jain & Monika Jain
2. A Text Book of Engineering Chemistry: by ShashiChawla
3. J. C. Kuriakose and J. Rajaram, "Chemistry in Engineering and Technology", Tata Mcraw-Hill Publications Co. Ltd., New Delhi
4. V.R. Gowrikar, N.V. Viswanathan and JaydevSreedhar, "Polymer Science", New Age International Pvt. Ltd., New Delhi

Course Name: Applied Chemistry Lab

Course Code: BSCC13151

Course Outline

List of Experiments

1. Determination of the total hardness of the water by EDTA method.
2. Determine of temporary and permanent hardness of water by EDTA method.
3. Determine of Calcium and Magnesium hardness of water using EDTA solution.
4. Determination of alkalinity of water sample.
5. Determination of Dissolve Oxygen (D.O.) in the given water sample.
6. To find the Melting and Eutectic point for a two component system by cooling curve

method.

7. Determination of viscosity of lubricant by Redwood Viscometer (No.1 & No.2).
8. Determination of flash point and fire point of oil by Pensky-Marten's flash point apparatus.
9. To find out Saponification Number of an Oil.
10. Determination of acid value of an oil
11. Determination of iodine value of an oil
12. Estimation of total iron in a iron alloy.
13. Preparation of copper pigment. And Preparation of Phenol-Formaldehyde resin.
14. Preparation of Aspirin

Suggested Readings

1. Practical Engineering Chemistry by K. Mukkanti, et.al, B.S. Publications, Hyderabad.
2. Inorganic quantitative analysis, Vogel.
3. Text Book of engineering chemistry by R. N. Goyal and Harrmendra Goel, Ane Books Private Ltd.,
4. A text book on experiments and calculation Engg. S.S. Dara.
5. Instrumental methods of chemical analysis, Chatwal, Anand, Himalaya Publications

Course Name: Applied Mathematics- II

Course Code: BSCC15150

Objectives

- The objective of the paper is to facilitate the student with the basics of Applied Mathematics that are required for an engineering student.
- To impart analytical ability in solving mathematical problems as applied to the respective branches of Engineering.
- To introduce students the theory and concepts of differential equations, linear algebra, Laplace transformations and Fourier series which will equip them with adequate knowledge of mathematics to formulate and solve problems analytically.

Course Outline:

Unit I:Ordinary Differential Equations and Applications

Exact differential equations, equations reducible to exact differential equations; Applications of differential equations of first order & first degree to simple electric circuits, Newton's law of cooling, heat flow and orthogonal trajectories, linear differential equations of second and higher order. Complete solution, complementary function and particular integral, method of

variation of parameters to find particular integral, Cauchy's and Legendre's linear equations, simultaneous linear equations with constant coefficients. Applications of linear differential equations to simple pendulum, oscillatory electric circuits;

Unit II: Laplace Transform

Definition, existence theorem (statement only), Laplace transform of derivatives, integrals and periodic functions; Unit step (Heaviside) & impulse (Dirac – Delta) functions. Inverse Laplace Transform. Convolution – theorem. Applications to solution of simple linear and simultaneous differential equations with constant coefficients and application to integral equations;

Unit III: Partial Differential Equations & its applications

Formation of partial differential equations, Lagrange's linear partial differential equation, first order non-linear partial differential equation, Charpit's method; Method of separation of variables and its applications to wave equation, one dimensional heat equation and two-dimensional heat flow (steady state solutions only).

Unit IV: Matrices & its Applications

Rank of a matrix, elementary transformations, elementary matrices, inverse using elementary transformations, normal form of a matrix, linear dependence and independence of vectors, consistency of linear system of equations, linear and orthogonal transformations, eigen values and eigenvectors, properties of eigen values, Cayley - Hamilton theorem and its applications, diagonalization of matrices, similar matrices, quadratic forms.

Suggested Readings:

1. E. kresyzig," Advance Engineering Mathematics", Wiley publications
2. Michael Greenberg, "Advance Engineering mathematics", Pearson.
3. R.K. Jain and S.R.K. Iyengar,"Advanced Engineering Mathematics "Narosa Publications
4. B. S. Grewal,"Higher Engineering Mathematics" Khanna Publications.
5. S. Ponnusamy, "Foundation of Complex Analysis" Narosa Publication
6. G.B. Thomas and R. N. Finny " Calculus and Analytic Geometry" Addison Wesley/ Narosa
7. Wylie R, " Advance Engineering mathematics" , McGraw-Hill
8. M. Spiegel, "Schaum's Outline on Laplace Transform, Tata McGraw-Hill

Course Name: Applied Physics-II
Course Code: BSCC16150

Objectives

- The objective of the paper is to facilitate the student with the basics of Applied Physics aspects that are required for his understanding of basic physics.

Course Outline:

Unit I: Fiber Optics and Holography

Spatial and temporal coherence, Coherence length, Coherence time and 'Q' factor for light Fundamental ideas about optical fiber, Propagation mechanism, Acceptance angle and cone, Numerical aperture, Single and Multi-Mode Fibers, Dispersion and Attenuation. Holography: Basic Principle of Holography, Construction and reconstruction of Image on hologram and applications of holography.

UnitII: Elements of Material Science

Bonding in Solids: Covalent bonding and Metallic bonding; Classification of Solids as Insulators, Semiconductors and Conductors; Semiconductors: Conductivity in Semiconductors, Determination of Energy gap of Semiconductor. X-Ray diffraction and Bragg's Law; Hall Effect: Theory, Hall Coefficient and applications.

UnitIII: Superconductors

Temperature dependence of resistivity in superconducting materials, Effect of magnetic field (Meissner effect), Temperature dependence of critical field, London equations, Josephson theory, persistent currents, Type I and Type II superconductors, BCS theory (Qualitative), High temperature superconductors and Applications of Super-conductors;

Unit IV: Atomic & Nuclear Physics

Bohr's atomic model and energy level diagram, Sommerfeld relativistic atomic model, general properties of nucleus, Mass defect and packing fraction, nuclear binding energy, Semi-empirical mass formula.

Unit V: Nuclear Radiation Detectors

Characteristics of gas filled detectors: general considerations, Constructions, Working and properties of: Ionization chamber, proportional counter, G. M. Counter and Scintillation Counter.

Suggested Readings:

1. Arthur Beiser 'Concepts of Modern Physics', [McGraw-Hill], 6th Edition 2009.
2. S.Vasudeva, 'Modern Engineering Physics', S. Chand, 6th Edition, 2013.
3. Richard Wolfson 'Essential University Physics' Pearson, Ist edition, 2009.
4. H.K. Malik & A. K. Singh 'Engineering Physics' [McGraw-Hill], Ist Edition, 2009.
5. C. Kittle, 'Mechanics', Berkeley Physics Course, Vol.- I. Latest Edition.
6. Irving Kaplan 'Nuclear Physics' Latest Edition.
7. John R. Taylor, Chris D. Zafirator and Michael A. Dubson, 'Modern Physics For Scientists and Engineers', PHI, 2nd Edition.
8. D.J. Griffith, 'Introduction to Electrodynamics', Prentice Hall, Latest Edition.

Course Name: Applied Physics-II Lab

Course Code: BSCC16151

Course Outline

List of Experiments

1. To determine the wavelength of monochromatic light by Newton's ring.
2. To find the wavelength of various colours of white light with the help of a plane transmission diffraction grating.
3. To determine the specific resistance of a given wire using Carey Foster's bridge.
4. To find the wavelength of sodium light by Michelson interferometer.
5. To find the resolving power of a telescope.
6. To convert a Galvanometer in to an ammeter of given range and calibrate it.
7. To convert a Galvanometer in to a voltmeter of given range and calibrate it.
8. To determine the dispersive power of material of a Prism for Violet Red and yellow colours of Mercury light with the help of a spectrometer.
9. To study the Charge & Discharge of a condenser and hence determine time constant (Both current and voltage graphs are to be plotted.
10. To find the value of Planck's constant by using a solar cell / photo electric cell.

Course Name: Engineering Graphics
Course Code: CSEC14150

Objectives:

- All phases of manufacturing or construction require the conversion of new ideas and design concepts into the basic line language of graphics. Therefore, there are many areas (civil, mechanical, electrical, architectural and industrial) in which the skills of the CAD technicians play major roles in the design and development of new products or construction. Students prepare for actual work situations through practical training in a new state-of-the-art computer designed CAD laboratory using engineering software. This course is designed to address:
    - to prepare you to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
    - to prepare you to communicate effectively.
    - to prepare you to use the techniques, skills, and modern engineering tools necessary for engineering practice
- To familiarize with the construction of geometrical figures
- To familiarize with the projection of 1D, 2D and 3D elements
- To familiarize with the sectioning of solids and development of surfaces
- To familiarize with the Preparation and interpretation of building drawing

Course Outline

Unit I: Fundamentals drawing standard

BIS, dimensioning, lettering, type of lines, scaling- conventions. Geometrical constructions dividing a given straight line into any number of equal parts, bisecting a given angle, drawing a regular polygon given one side, special methods of constructing a pentagon and hexagon – conic sections – ellipse – parabola – hyperbola - cycloid – trochoid;

Unit II: Orthographic projection

Introduction to orthographic projection, drawing orthographic views of objects from their isometric views - Orthographic projections of points lying in four quadrants, Orthographic projection of lines parallel and inclined to one or both planes Orthographic projection of planes inclined to one or both planes.

Unit III: Projections of simple solids

Axis perpendicular to HP, axis perpendicular to VP and axis inclined to one or both planes. Sectioning of solids Section planes perpendicular to one plane and parallel or inclined to other plane.

Unit IV: Intersection of surfaces

Intersection of cylinder & cylinder, intersection of cylinder & cone, and intersection of prisms; Development of surfaces Development of prisms, pyramids and cylindrical & conical surfaces; Isometric and perspective projection Isometric projection and isometric views of different planes and simple solids, introduction to perspective projection; Computer aided drafting Introduction to computer aided drafting package to make 2-D drawings.

Course Name: Engineering Graphics lab

Course Code: CSEC14151

List of Practicals

1. One Sheet on Lettering, Types of Lines, Symbols used
2. One Sheet on Conic Sections like- Ellipse, Parabola , Hyperbola and Cycloid.
3. Two Sheet on Simple Scale, Diagonal Scale and Scale of Chord.
4. One Sheet on Orthographic Projections of Points.
5. One Sheets on Orthographic Projections of Lines.
6. One Sheet on Orthographic Projections of Planes.
7. Two Sheets on Projections of Simple Solids.
8. One Sheet on Sectioning of Solids.
9. One Sheet on Intersection of Surfaces.
10. One Sheet on development of Surfaces.

Course Name Basic Mechanical Engineering
Course Code: CSEC14152

Objectives

- To familiarize with the basic machine elements
- To familiarize with the Sources of Energy and Power Generation
- To familiarize with the various manufacturing processes
- The basic machine elements
- The Sources of Energy and Power Generation
- The various manufacturing processes

Course Outline:

Unit I: Engineering Materials

Materials and Civilization, their socio economic impact; Classification of engineering material, composition of cast iron and carbon steels , wrought iron and their mechanical properties, stress-strain diagram, Alloy steels: stainless steel, tool steel. Alloys of Non Ferrous Metals: Common uses of various non-ferrous metals (Copper, Zinc, Tin, Magnesium, Lead, Aluminum etc.) & alloys and its composition such as Cu-alloys: Brass, Bronze, Al-alloys.

Unit II: Fluids

Fluid and continuum, Physical properties of fluids, Rheology of fluids, Types of fluid flows: Continuum & free molecular flows. Steady and unsteady, uniform and non- uniform, laminar and turbulent flows, rotational and irrotational flows, compressible and incompressible flows, subsonic, sonic and supersonic flows, sub-critical, critical and supercritical flows, one, two and three dimensional flows, streamlines, continuity equation, Bernauli's equation for incompressible fluids. Working principle of fluid coupling, pumps, compressors, turbines;

Unit III: Simple Stress, Bending &Torsion

Normal and shear stresses, One Dimensional Loading, members of varying cross section, bars in series, Elastic constants, Modulas of Elasticity, Strain energy.
Bending (Flexural) Stresses: theory of pure bending, neutral surface and neutral axis, Bending Equation, stresses in beams of different cross sections.
Torsion: Torsion Equation, combined bending & torsion of solid & hollow shafts.

Unit IV: Friction & IC Engine Static and Kinetic friction

Laws of dry friction, co-efficient of friction, angle of friction, angle of repose, cone of friction, Belt drive- derivation of equation; Internal Combustion Engines: Classification of I.C. Engines and their parts, working principle and comparison between 2 Stroke and 4 stroke engine , difference between SI and CI engines. Pv and T-s diagrams of Otto and Diesel cycles.

Practical Learning-

1. To Study the working of 2 Stroke diesel/ petrol Engine.
2. To Study the Working of 4 Stroke diesel/ Petrol Engine.
3. To Study the working of Fluid Couplings.
4. To Study the working of Pumps.
5. To Study the working of Turbines

Suggested Readings:

1. Engg Mechanics by A.K.Tayal (Umesh Publications).
2. Engg Mechanics by Basudeb Bhattacharya (Oxford university Press)
3. Engg Mechanics by Irving H. Shames (Pearson publications).
4. Engg Mechanics by U.C.Jindal (Galgotia Publications).
5. Engg Mechanics by Beer &Johnston(TMH).
6. Engg Mechanics by K.L.Kumar (TMH).
7. Engg Mechanics by Sadhu Singh (Khanna Publishers).

Course Name: Environmental Studies

Course Code: AECE55000

Objectives

- To gain knowledge about environment and its conservation along with sustainable development.
- To define and use correctly the common terms of environmental science.
- To explain what makes up the environment, how it functions, and how humans are part of it.
- To apply the concepts and principles of environmental science to propose solutions to specific environmental problems.
- To analysis environmental writings and predictions and their impact on subsequent developments in human relationship with the environment.
- To evaluate the adequacy of conclusions about environmental phenomena.

Course Outline:

Unit I: The Multidisciplinary Nature of Environmental Studies:

Definition, scope and importance need for public awareness. Natural Resources Renewable and Non-renewable Resources: Natural resources and associated problems. (a) Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people. (b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems. (c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies. (d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, Case studies. (e) Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources. Case studies, (f) Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification. Role of an individual in conservation of natural resources, Equitable use of resources for sustainable lifestyles;

Unit II: Ecosystems

Concept of an ecosystem, Structure and function of an ecosystem, Producers, consumers and decomposers, Energy flow in the ecosystem, Ecological succession, Food chains, food webs and ecological pyramids. Introduction, types, characteristic features, structure and function of the following ecosystem: (a) Forest ecosystem (b) Grassland ecosystem (c) Desert ecosystem (d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries).

Unit III: Biodiversity and Its Conservation

Introduction, definition: genetic, species and ecosystem diversity, Biogeographical classification of India, Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values. Biodiversity at global, National and local levels, India as a mega-diversity nation, Hot-spots of biodiversity; Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts. Endangered and endemic species of India, Conservation of biodiversity: in-situ and ex-situ conservation of biodiversity.

Unit IV: Environmental Pollution

Definition, Causes, effects and control measures of (a) Air pollution (b) Water pollution (c) Soil pollution (d) Marine pollution (e) Noise pollution (f) Thermal pollution (g) Nuclear hazards. Solid waste management: Causes, effects and control measures of urban and industrial wastes. Role of an individual in prevention of pollution, Pollution case studies; Disaster management: Foods, earthquake, cyclone and landslides.

Unit V: Social Issues and the Environment

From unsustainable to sustainable development, Urban problems related to energy. Water conservation, rain water harvesting, watershed management. Resettlement and rehabilitation of people; its problems and concerns, Case studies, Environmental ethics: Issues and possible solutions. Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, Case studies, Waste land reclamation. Consumerism and waste products, Environment Protection Act, Air (Prevention and Control of Pollution) Act, Water (Prevention and Control of Pollution) Act, Wildlife Protection Act, Forest Conservation Act. Issues involved in enforcement of environmental legislation, Public awareness.

Unit VI: Human Population and the Environment

Population growth, variation among nations, Population explosion—Family Welfare Programme, Environment and human health, Human rights, Value education, HIV/AIDS, Women and Child Welfare, Role of Information Technology in environment and human health, Case Studies, Field Work. Visit to a local area to document environmental assets - river/forest/grassland/hill/mountain. Visit to a local polluted site - Urban/Rural/Industrial/Agricultural. Study of common plants, insects, birds. Study of simple ecosystems—pond, river, hill slopes, etc.

Suggested Readings

1. Environmental Geography, H.M. Saxena, Rawat Pub.
2. A Textbook Of Environment, K.M. Agrawal; P.K. Sikdar; S.C. Deb, McMillanPub.
3. A Textbook of Environmental Studies, D K Asthana&MeeraAsthana, S. Chand Pub.
4. Environmental Studies, V. K. Ahluwalia, The Energy and Resources Institute, Pub, (2012).
5. Environmental Chemistry, A.K. Dey, New Age Pub.
6. Environmental Biology, K.C. Agarwal, Nidi Pub. Ltd. Bikaner

Course Name: Ability and Skill Enhancement - II
Course Code: SEC077002

Objectives

- To improve the communication skills of the students with respect to pronunciation. The classes are interactive and activity based.

Course Outline - Final Assessment – Debate/Group Discussion

Unit I: Phonetics

Phonetic symbols and the International Phonetic Alphabets (IPA), The Description and Classification of Vowels (Monophthongs& Diphthong) Consonants, Phonetic Transcription & Phonology, Syllable, Stress & Intonations, and Reading aloud, recording audio clips.

Unit II: Vocabulary Building

Idioms and Phrases, Words Often Confused, One word Substitution, Word Formation: Prefix & Suffix.

Unit III: Ethics & Etiquettes

What are ethics, what are values, difference between ethics and morals, Business ethics, workplace ethics, what are virtues for e.g. civic virtues, etc. Human ethics and values- 5 core human values are: right conduct, living in peace, speaking the truth, loving and care, and helping others. Etiquette awareness, Importance of First Impression, Personal Appearance & Professional presence, Personal Branding, Dressing Etiquette, Dining Etiquette.

Unit IV: Reading & Writing Skills

Reading Comprehension, News Reading, Picture Description, Paragraph Writing, News Writing.

Unit V -Listening & Speaking Skills

Public Speaking, Debate, Inspirational Movie Screening, Skit Performance.

Note: The review of syllabus happens of periodic basis for the benefit of students and in case there is change in curriculum due to review, students would be intimated in writing.

9. Lesson Plans

BSCC15150– Applied Mathematics-II

Unit	Particulars	Class No.	Pedagogy of Class
Unit-I	Ordinary Differential Equations and Applications Exact differential equations	C-1	Lecture
Unit-I	Equations reducible to exact differential equations	C-2	Lecture
Unit-I	Equations reducible to exact differential equations: CASE I & CASE II	C-3	Lecture
Unit-I	Equations reducible to exact differential equations: CASE III & CASE IV	C-4	Lecture
Unit-I	Equations reducible to exact differential equations: CASE V	C-5	Lecture
Unit-I	Questions Based on Non - Exact Differential Equations reducible to exact differential equations	C-6	Lecture
Unit-I	Applications of differential equations of first order & first degree to simple electric circuits	C-7	Lecture
Unit-I	Application of Differential Equation: Newton's law of cooling; heat flow	C-8	Lecture
Unit-I	Clarification Class I	C-9	Clarification Class
Unit-I	Home Assignment I		Home Assignments
Unit-I	Application of differential: Orthogonal trajectories	C-10	Lecture
Unit-I	Linear differential equations of second and higher order	C-11	Lecture
Unit-I	Complete solution, complementary function and particular integral	C-12	Lecture
Unit-I	Complete solution, complementary function and particular integral	C-13	Lecture
Unit-I	Clarification Class II	C-14	Clarification Class
Unit-I	Solutions of Problems related to earlier topics	C-15	Lecture
Unit-I	Complete solution, complementary function and particular integral	C-16	Lecture
Unit-I	Method of variation of parameters to find particular integral	C-17	Lecture
Unit-I	Cauchy's and Legendre's linear equations	C-18	Lecture
Unit-I	Simultaneous linear equations with constant coefficients	C-19	Lecture
Unit-I	Applications of linear differential equations to simple pendulum, Oscillatory electric Circuits	C-20	Lecture
Unit-II	Clarification Class III	C-21	Clarification Class
Unit-II	Laplace Transform: Definition, existence theorem (statement only); Laplace transform of derivatives	C-22	Lecture
Unit-II	Laplace transform of derivatives	C-23	Lecture
Unit-II	Laplace transform of integrals and periodic functions	C-24	Lecture
Unit-II	Laplace transform of integrals and periodic functions; Unit step (Heaviside)	C-25	Lecture
Unit-II	Classroom Assignment I	C-26	Class Assignment
Unit-II	Home Assignment		Home Assignments

Unit-II	impulse (Dirac – Delta) functions	C-27	Lecture
Unit-II	Inverse Laplace Transform	C-28	Lecture
Unit-II	Inverse Laplace Transform	C-29	Lecture
Unit-II	Inverse Laplace Transform	C-30	Lecture
Unit-II	Clarification Class	C-31	Clarification Class
Unit-II	Solutions of Problems related to earlier topics	C-32	Lecture
Unit-II	Inverse Laplace Transform	C-33	Lecture
Unit-II	Convolution – theorem	C-34	Lecture
Unit-II	Questions Based on Convolution - theorem	C-35	Lecture
Unit-II	Applications to solution of simple linear and simultaneous differential equations with constant coefficients and application to integral equations	C-36	Lecture
Unit-III	Partial Differential Equations & its applications: Formation of partial differential equations	C-37	Lecture
Unit-III	Lagrange's linear partial differential equation	C-38	Lecture
Unit-III	Clarification Class IV	C-39	Clarification Class
Unit-III	Solutions of Problems related to earlier topics	C-40	Lecture
Unit-III	First order non-linear partial differential equation	C-41	Lecture
Unit-III	Home Assignment		Home Assignments
Unit-III	First order non-linear partial differential equation	C-41	Lecture
Unit-III	Charpit's method: Introduction, questions based on Charpit's Method	C-42	Lecture
Unit-III	Some typical question based on Charpit's method	C-43	Lecture
Unit-III	Method of separation of variables	C-44	Lecture
Unit-III	Application of Method of separation of variables to Wave equation	C-45	Lecture
Unit-III	One dimensional heat equation and two-dimensional heat flow (steady state solutions only)	C-46	Lecture
Unit-IV	Matrices & its Applications: Rank of a matrix	C-47	Lecture
Unit-IV	Elementary transformations	C-48	Lecture
Unit-IV	Solutions of Problems related to earlier topics	C-49	Lecture
Unit-IV	Elementary matrices	C-50	Lecture
Unit-IV	Normal form of a matrix	C-51	Lecture
Unit-IV	Clarification Class	C-52	Clarification Class
Unit-IV	Linear dependence and independence of vectors	C-53	Lecture
Unit-IV	Consistency of linear system of equations, linear and orthogonal transformations	C-53	Lecture
Unit-IV	Eigenvalues and eigenvectors,	C-53	Lecture
Unit-IV	Properties of eigenvalues	C-54	Lecture
Unit-IV	Cayley - Hamilton theorem and its applications	C-55	Lecture
Unit-IV	diagonalization of matrices	C-56	Lecture
Unit-IV	Presentation I	C-57	Presentation
Unit-IV	Similar matrices, quadratic forms; Similar matrices; quadratic forms of matrices; Solutions of Problems related to earlier topics	C-58	Lecture
Unit-IV	Clarification Class V	C-59	Clarification Class
Unit-IV	Classroom Assignment II	C-60	Clarification Class

BSCC16150– Applied Physics-II

Unit	Particulars	Class No.	Pedagogy of Class
Unit-I	FIBER OPTICS AND HOLOGRAPHY		
Unit-I	Spatial and temporal coherence	C-1	Lecture
Unit-I	Coherence length, Coherence time	C-2	Lecture
Unit-I	'Q' factor for light Fundamental ideas about optical fiber	C-3	Lecture
Unit-I	Propagation mechanism	C-4	Lecture
Unit-I	Acceptance angle and cone, Numerical aperture	C-5	Lecture
Unit-I	Single and Multi Mode Fibers	C-6	Lecture
Unit-I	Dispersion and Attenuation	C-7	Lecture
Unit-I	Holography: Basic Principle of Holography	C-8	Lecture
Unit-I	Construction and reconstruction of Image on hologram and applications of holography	C-9	Lecture
Unit-I	Clarification Class	C-10	Clarification Class
Unit-I	Take home assignment		home assignment
Unit-II	ELEMENTS OF MATERIAL SCIENCE		
Unit-II	Bonding in Solids: Covalent bonding and Metallic bonding.	C-11	Lecture
Unit-II	Classification of Solids as Insulators, Semiconductors and Conductors	C-12	Lecture
Unit-II	Semiconductors: Conductivity in Semiconductors	C-13	Lecture
Unit-II	Determination of Energy gap of Semiconductor	C-14	Lecture
Unit-II	X-Ray diffraction and Bragg's Law	C-15	Lecture
Unit-II	Hall Effect: Theory	C-16	Lecture
Unit-II	Hall Coefficient and applications	C-17	Lecture
Unit-II	Clarification Class	C-18	Clarification Class
Unit-II	Classroom Assignment	C-19	Class Assignment
Unit-II	Presentation	C-20	Presentation
Unit-III	SUPERCONDUCTORS		
Unit-III	Temperature dependence of resistivity in superconducting materials	C-21	Lecture
Unit-III	Effect of magnetic field (Meissner effect)	C-22	Lecture
Unit-III	Temperature dependence of critical field	C-23	Lecture
Unit-III	London equations	C-24	Lecture
Unit-III	Josephson theory, persistent currents	C-25	Lecture
Unit-III	Type I and Type II superconductors	C-26	Lecture
Unit-III	BCS theory (Qualitative)	C-27	Lecture
Unit-III	High temperature superconductors and Applications of Super-conductors	C-28	Lecture
Unit-III	Clarification Class	C-29	Clarification Class
Unit-III	Classroom Assignment	C-30	Class Assignment
Unit-III	Take home assignment		Home Assignments
Unit-IV	ATOMIC AND NUCLEAR PHYSICS		
Unit-IV	Bohr's atomic model and energy level diagram	C-31	Lecture
Unit-IV	Sommerfeld relativistic atomic model, general properties of nucleus	C-32	Lecture

Unit-IV	Mass defect and packing fraction, nuclear binding energy,	C-33	Lecture
Unit-IV	Semi-empirical mass formula	C-34	Lecture
Unit-IV	Clarification Class	C-35	Clarification Class
Unit-IV	Classroom Assignment	C-36	Class Assignment
Unit-IV	Quiz	C-37	Quiz
Unit-IV	Webinar	C-38	Webinar
Unit-IV	Seminar	C-39	Seminar
Unit-IV	Guest Lecture	C-40	Guest lecture
Unit-IV	Take home assignment		Home Assignments
Unit-V	NUCLEAR RADIATION DETECTORS		
Unit-V	Characteristics of gas filled detectors: general considerations, Constructions	C-41	Lecture
Unit-V	Working and properties of: Ionization chamber, proportional counter	C-42	Lecture
Unit-V	G. M. Counter and Scintillation Counter	C-43	Lecture
Unit-V	Clarification Class	C-44	Clarification Class
Unit-V	Classroom Assignment	C-45	Class Assignment

BSCC16151– Applied Physics Lab-II

S. No.	Particulars	Class No.	Pedagogy of Class
1	To determine the wavelength of monochromatic light by Newton's ring.	P-1,2	Practical
2	To find the wavelength of various colours of white light with the help of a plane transmission diffraction grating.	P-3,4	Practical
3	To determine the specific resistance of a given wire using Carey Foster's bridge.	P-5,6	Practical
4	To find the wavelength of sodium light by Michelson interferometer	P-7,8	Practical
5	To find the resolving power of a telescope.	P-9,10	Practical
6	To convert a Galvanometer in to an ammeter of given range and calibrate it.	P-11,12	Practical
7	To convert a Galvanometer in to a voltmeter of given range and calibrate it.	P-13,14	Practical
8	To determine the dispersive power of material of a Prism for Violet Red and yellow colours of Mercury light with the help of a spectrometer.	P-15,16	Practical
9	To study the Charge & Discharge of a condenser and hence determine time constant (Both current and voltage graphs are to be plotted.	P-17,18	Practical
10	To find the value of Planck's constant by using a solar cell / photo electric cell.	P-19,20	Practical

CSEC14150– Engineering Graphics

Unit	Particulars	Class No.	Pedagogy of Class
Unit-I	INTRODUCTION		
Unit-I	Fundamentals Drawing standard - BIS, dimensioning,	C-1	Lecture
Unit-I	lettering,	C-2	Lecture
Unit-I	type of lines, scaling conventions.	C-3	Lecture
Unit-I	Geometrical constructions Dividing a given straight line into any number of	C-4	Lecture
Unit-I	bisecting a given angle,	C-5	Lecture
Unit-I	drawing a regular polygon given one side,	C-6	Lecture
Unit-I	methods of constructing a pentagon and hexagon	C-7	Lecture
Unit-I	conic sections – ellipse – parabola	C-8	Lecture
Unit-I	hyperbola - cycloid – trochoid.	C-9	Lecture
	Clarification class 1	C-10	Clarification Class
Unit-II	ORTHOGRAPHIC PROJECTIONS		
Unit-II	Orthographic projection Introduction to orthographic projection,	C-11	Lecture
Unit-II	drawing orthographic views of objects from their isometric views	C-12	Lecture
Unit-II	Orthographic projections of points lying in four quadrants,	C-13	Lecture
Unit-II	Orthographic projection of lines parallel and inclined to one or both planes	C-14	Lecture
Unit-II	Orthographic projection of planes inclined to one or both planes.	C-15	Lecture
Unit-II	Problems on Orthographic Projection	C-15	Lecture
Unit-II	Clarification class 2	C-16	Clarification Class
	Guest Lecture	C-17	Guest lecture
	Class room Assignment 1	C-18	Class Assignment
	Home Assignment -1		Home Assignments
Unit-III	PROJECTIONS OF SOLIDS		
Unit-III	Projections of simple solids - axis perpendicular to HP,	C-19	Lecture
Unit-III	axis perpendicular to VP	C-20	Lecture
Unit-III	and axis inclined to one or both planes.	C-21	Lecture
Unit-III	Sectioning of solids Section planes perpendicular to one plane	C-22	Lecture
Unit-III	and parallel or inclined to other plane.	C-23	Lecture
Unit-III	Problems on projection of solid	C-24	Lecture
Unit-III	clarification class 3	C-25	Clarification Class
	Activity	C-26	Activity
	presentation 1	C-27	Presentation
Unit-IV	INTERSECTION OF SURFACES		
Unit-IV	Intersection of surfaces Intersection of cylinder & cylinder,	C-28	Lecture
Unit-IV	intersection of cylinder & cone,	C-29	Lecture
Unit-IV	and intersection of prisms.	C-30	Lecture
Unit-IV	problems on prisms	C-31	Lecture

Unit-IV	Development of surfaces Development of prisms,	C-32	Lecture
Unit-IV	pyramids and cylindrical	C-33	Lecture
Unit-IV	conical surfaces.	C-34	Lecture
Unit-IV	Problems on pyramid and cylindrical	C-35	Lecture
Unit-IV	Isometric and perspective projection Isometric projection	C-36	Lecture
Unit-IV	isometric views of different planes and simple solids,	C-37	Lecture
Unit-IV	introduction to perspective projection.	C-38	Lecture
Unit-IV	Computer aided drafting Introduction to computer aided drafting package to make 2-D drawings.	C-39	Lecture
Unit-IV	Problems on isometric view	C-40	Lecture
	clarification Class 4	C-41	Clarification Class
	class room Assignment 2	C-42	Class Assignment
	workshop	C-43	Workshop
	Quiz	C-44	Quiz
	Seminar	C-45	Seminar

CSEC14151– Engineering Graphics Lab

S. No.	Particulars	Class No.	Pedagogy of Class
1	One Sheet on Lettering, Types of Lines, Symbols used	P-1	Practical
2	One Sheet on Conic Sections like- Ellipse, Parabola	P-2	Practical
3	One Sheet on Conic Sections like- Hyperbola	P-3	Practical
4	One Sheet on Conic Sections like- Cycloid.	P-4	Practical
5	Two Sheet on Simple Scale, Diagonal Scale and Scale of Chord	P-5	Practical
6	Two Sheet on Simple Scale, Diagonal Scale and Scale of Chord	P-6	Practical
7	One Sheet on Orthographic Projections of Points.	P-7	Practical
8	One Sheets on Orthographic Projections of Lines	P-8	Practical
9	One Sheet on Orthographic Projections of Planes	P-9	Practical
10	Two Sheets on Projections of Simple Solids.	P-10	Practical
11	Two Sheets on Projections of Simple Solids.	P-11	Practical
12	One Sheet on Sectioning of Solids.	P- 12	Practical
13	One Sheet on Intersection of Surfaces.	P-13	Practical
14	One Sheet on development of Surfaces.	P-14	Practical
15	One Sheet on development of Surfaces.	P-15	Practical

BSCC13150– Applied Chemistry

Unit	Particulars	Class No.	Pedagogy of Class
Unit-I	LUBRICATION AND LUBRICANTS		
Unit-I	Lubrication and Lubricants, Functions	C-1	Lecture
Unit-I	Mechanism of Lubrication, Thick Film, Thin Film	C-2	Lecture
Unit-I	Extreme pressure Lubrication, Classification of Lubricants	C-3	Lecture
Unit-I	Properties of Lubricants, Viscosity & Viscosity index	C-4	Lecture
Unit-I	Flash Point, Fire Point, cloud point, pour point	C-5	Lecture
Unit-I	Saponification value, Acid Value, Iodine value, Numericals	C-6	Lecture
Unit-I	Consistency, Drop point	C-7	Lecture
Unit-I	Synthetic lubricants, additives	C-8	Lecture
Unit-II	Clarification Class	C-9	Clarification Class
Unit-II	PHASE RULE		
Unit-II	Phase rule, components	C-10	Lecture
Unit-II	Phase, components, degree of freedom	C-11	Lecture
Unit-II	Criteria of Equilibrium	C-12	Lecture
Unit-II	Derivation of Gibbs phase rule	C-13	Lecture
Unit-II	Derivation of Clausius Clayperon equation and its importance	C-14	Lecture
Unit-II	One Component- Water and Sulphur Systems	C-15	Lecture
Unit-II	Two component Pb-Ag system. Pattinsons process	C-16	Lecture
Unit-II	System having congruent melting points (Zinc-Magnesium system)	C-17	Lecture
Unit-II	System having incongruent melting points (Na-K system)	C-18	Lecture
Unit-II	Applications of Phase rule: Freeze drying, safety plugs, solders, freezing mixtures	C-19	Lecture
	Presentation	C-20	Presentation
	Clarification Class	C-21	Clarification Class
	Class Assignment	C-22	Class Assignment
Unit-III	WATER		
Unit-III	Introduction and specification of water	C-23	Lecture
Unit-III	Hardness and its determination by EDTA method	C-24	Lecture
Unit-III	Numericals based on hardness and EDTA	C-25	Lecture
Unit-III	Alkalinity and its determination (Numericals)	C-26	Lecture
Unit-III	Take Home Assignments		Home Assignments
Unit-III	Boiler feed water, Boiler problems, Scale sludge formation	C-27	Lecture
Unit-III	Priming and foaming, caustic embrittlement causes and prevention	C-28	Lecture
Unit-III	Boiler corrosion causes and prevention	C-29	Lecture
Unit-III	Desalination by Reverse Osmosis and Electrodialysis	C-30	Lecture
Unit-III	Disinfection by break-point chlorination.	C-31	Lecture
Unit-III	Water Softening by Internal Treatment: carbonate & phosphate conditioning, colloidal conditioning & calgon treatment	C-32	Lecture

Unit-III	Water Softening by External Treatment: Lime-Soda Process Numericals	C-33	Lecture
Unit-III	Zeolite process	C-34	Lecture
Unit-III	Ion-Exchange Process.	C-35	Lecture
	Clarification Class	C-36	Clarification Class
	Webinar	C-37	Webinar
	Class Assignment	C-38	Class Assignment
Unit-IV	CORROSION & ITS CONTROL		
Unit-IV	Corrosion causes, effects & consequences	C-39	Lecture
Unit-IV	Chemical or Dry corrosion & its mechanism (Pilling Bedworth rule)	C-40	Lecture
Unit-IV	Electrochemical or Wet corrosion & its mechanism	C-41	Lecture
Unit-IV	Rusting of Iron, Passivity, Galvanic Series, Galvanic Corrosion	C-42	Lecture
Unit-IV	Guest Lecture	C-43	Guest Lecture
Unit-IV	Soil Corrosion Pitting Corrosion, Concentration Cell or Differential Aeration Corrosion, Stress Corrosion	C-44	Lecture
Unit-IV	Quiz	C-45	Quiz
Unit-IV	Factors Influencing Corrosion: Nature of metal and nature of corroding environment;	C-46	Lecture
Unit-IV	Protective measures: Galvanization, Tinning Cathodic Protection,	C-47	Lecture
Unit-IV	Sacrificial Anodic protection, Prevention of Corrosion by Material selection & Design.	C-48	Lecture
	Clarification Class	C-49	Clarification Class
	Take Home Assignments		Home Assignments
Unit-V	POLYMERS AND POLYMERISATION		
Unit-V	Organic polymers and its classification	C-50	Lecture
Unit-V	Mechanism of polymerization: free radical, cationic	C-51	Lecture
Unit-V	anionic and coordination polymerization	C-52	Lecture
Unit-V	effect of structure on properties of polymers	C-53	Lecture
Unit-V	preparation, properties and technical applications of thermo-plastic (PVC, PVA),	C-54	Lecture
Unit-V	thermosets (PF, UF),	C-55	Lecture
Unit-V	elastomers (SBR, GR-N), Inorganic polymer: silicones,	C-56	Lecture
Unit-V	elastomers (SBR, GR-N), Inorganic polymer: silicones,	C-57	Lecture
Unit-V	introduction to polymeric composites	C-58	Lecture
	Clarification Class	C-59	Clarification Class
	Quiz	C-60	Quiz

BSCC13151– Applied Chemistry Lab

S. No.	Particulars	Class No.	Pedagogy of Class
1	General instructions, precautions	P-1,2	Practical
2	Determination of the total hardness of the water by EDTA method.	P-3,4	Practical
3	Determine of temporary and permanent hardness of water by EDTA method	P-5,6	Practical
4	Determination of alkalinity of water sample.	P-7,8	Practical
5	Determination of Dissolve Oxygen (D.O.) in the given water sample.	P-9,10	Practical
6	Determine of Calcium and Magnesium hardness of water using EDTA solution.	P-11,12	Practical
7	To find the Melting and Eutectic point for a two component system by cooling curve method.	P-13,14	Practical
8	Determination of viscosity of lubricant by Redwood Viscometer (No.1 & No.2).	P-15,16	Practical
9	Determination of flash point and fire point of oil by Pensky-Marten's flash point apparatus.	P-17,18	Practical
10	To find out Saponification Number of an Oil.	P-19,20	Practical
11	Determination of acid value of an oil	P-21,22	Practical
12	Determination of iodine value of an oil	P-23,24	Practical
13	Estimation of total iron in a iron alloy.	P-25,26	Practical
14	Preparation of copper pigment. And Preparation of Phenol-Formaldehyde resin.	P-27,28	Practical
15	Preparation of Aspirin	P-29,30	Practical

CSEC14152– Basic Mechanical Engineering

Unit	Particulars	Class No.	Pedagogy of Class
Unit-I	Fluids: Fluid and continuum, Physical properties of fluids	C-1	Lecture
Unit-I	Rheology of fluids, Types of fluid flows: Continuum & free molecular flows. Steady and unsteady, uniform and non uniform flow	C-2	Lecture
Unit-I	One, two and three dimensional flows streamlines, uniform and non uniform flow	c-3	Lecture
Unit-I	Subsonic, sonic and supersonic flows, sub-critical, critical and supercritical flows,	C-4	Lecture
Unit-I	Laminar and turbulent flows rotational and irrotational flows, compressible and incompressible flows	C-5	Lecture
Unit-I	Continuity equation, Bernauli's equation for incompressible fluids.	C-6	Lecture
Unit-I	Working principle of fluid coupling, pumps, compressors, turbines.	C-7	Lecture
Unit-I	Working principle of fluid coupling, pumps, compressors, turbines.	C-8	Lecture
Unit-I	Clarification class	C-9	Clarification class
Unit-I	Normal and shear stresses	C-10	Lecture
Unit-II	One Dimensional Loading: members of varying cross section, bars in series	C-11	Lecture
Unit-II	Elastic constants, Modulas of Elasticity, Strain energy	C-12	Lecture
Unit-II	Bending (Flexural) Stresses: theory of pure bending	C-13	Lecture
Unit-II	Bending (Flexural) Stresses: neutral surface and neutral axis	C-14	Lecture
Unit-II	Bending Equation, stresses in beams of different cross sections.	C-15	Lecture
Unit-II	Torsion: Torsion Equation, combined bending & torsion of solid shaft	C-16	Lecture
Unit-II	Torsion: Torsion Equation, combined bending & torsion of hollow shafts	C-17	Lecture
Unit-II	Clarification class	C-18	Clarification class
Unit-III	Static and Kinetic friction, laws of dry friction,	C-19	Lecture
Unit-III	Co-efficient of friction, angle of friction, angle of repose, cone of friction	C-20	Lecture
Unit-III	Guest lecture	C-21	Guest lecture
Unit-III	Guest lecture	C-22	Guest lecture
Unit-III	Belt drives- derivation of equation open belt	C-23	Lecture
Unit-III	Belt drives- derivation of equation close belt	C-24	Lecture
Unit-III	Internal Combustion Engines: Classification of I.C. Engines and their parts	C-25	Lecture
Unit-III	Working principle of 2 Stroke SI and CI engine	C-26	Lecture
Unit-III	Working principle of 4 stroke engine, SI and CI engine	C-27	Lecture

Unit-III	Comparison between 2 Stroke and 4 stroke engine and difference between SI and CI engines	C-28	Lecture
Unit-III	Pv and T-s diagrams of Otto and Diesel cycles	C-29	Lecture
Unit-III	Clarification Class	C-30	Clarification Class
Unit-III	Quiz	C-31	Quiz
Unit-III	Presentation 1	C-32	Presentation 1
Unit-III	Presentation 2	C-33	Presentation 2
Unit-III	Presentation 3	C-34	Presentation 3
Unit-III	Research work	C-35	Activity
Unit-III	Research work	C-36	Activity
Unit-III	Research work	C-37	Activity
Unit-III	Clarification class	C-38	Clarification class
Unit-III	Engineering Materials: Materials and Civilization, their socio economic impact. Classification of engineering material	C-39	Lecture
Unit-IV	Composition of cast iron and carbon steels, wrought iron and their mechanical properties,	C-40	Lecture
Unit-IV	Composition of cast iron and carbon steels, wrought iron and their mechanical properties,	C-41	Lecture
Unit-IV	Stress-strain diagram	C-42	Lecture
Unit-IV	Alloy steels: stainless steel, tool steel. Alloys of Non Ferrous Metals	C-43	Lecture
Unit-IV	Common uses of various non-ferrous metals (Copper, Zinc, Tin, Magnesium, Lead, Aluminum etc.) & alloys and its composition such as Cu-alloys: Brass, Bronze, Al-alloys.	C-44	Lecture
Unit-IV	Common uses of various non-ferrous metals (Copper, Zinc, Tin, Magnesium, Lead, Aluminum etc.) & alloys and its composition such as Cu-alloys: Brass, Bronze, Al-alloys.	C-45	Lecture
Unit-IV	Clarification class	C-45	Clarification class

AECE55000– Environmental Studies

Unit	Particulars	Class No.	Pedagogy of Class
Unit-I	Introduction to environmental studies	C-1	Lecture
Unit-I	Multidisciplinary nature of environmental studies	C-2	Lecture
Unit-I	Scope and importance; Concept of sustainability and sustainable development.	C-3	Lecture
Unit-I	Clarification Class	C-4	Clarification Class
Unit-II	What is an ecosystem?	C-5	Lecture
Unit-II	Structure and function of ecosystem	C-6	Lecture
Unit-II	Energy flow in an ecosystem: food chains, food webs and ecological succession	C-7	Lecture
Unit-II	Forest ecosystem	C-8	Lecture
Unit-II	Grassland ecosystem	C-9	Lecture
Unit-II	Desert ecosystem	C-10	Lecture
Unit-II	Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)	C-11	Lecture
Unit-II	Clarification Class	C-12	Clarification Class
Unit-III	Natural Resources: Renewable and Non-renewable Resources	C-13	Lecture
Unit-III	Land resources and land use change; Land degradation, soil erosion and desertification.	C-14	Lecture
Unit-III	Deforestation: Causes and impacts due to mining, dam building on environment, forests, biodiversity and tribal populations	C-15	Lecture
Unit-III	Water: Use and overexploitation of surface and ground water, floods, droughts, conflicts over water (international & inter-state).	C-16	Lecture
Unit-III	Energy resources: Renewable and non renewable energy sources	C-17	Lecture
Unit-III	use of alternate energy sources, growing energy needs, case studies.	C-18	Lecture
Unit-III	Clarification Class	C-19	Clarification Class
Unit-IV	Levels of biological diversity: genetic, species and ecosystem diversity	C-20	Lecture
Unit-IV	Biogeographic zone of India; Biodiversity patterns and global biodiversity hot spots.	C-21	Lecture
Unit-IV	India as a mega biodiversity nation; Endangered and endemic species of India	C-22	Lecture
Unit-IV	Threats to biodiversity: Habitat loss, poaching of wildlife, man wildlife conflicts, biological invasions;	C-23	Lecture
Unit-IV	Conservation of biodiversity: Insitu and Exsitu conservation of biodiversity	C-24	Lecture
Unit-IV	Ecosystem and biodiversity services: Ecological, economic, social, ethical, aesthetic and Informational value.	C-25	Lecture
Unit-IV	Clarification Class	C-26	Clarification Class
Unit-V	Environmental Pollution	C-27	Lecture
Unit-V	Environmental pollution: types, causes, effects and	C-28	Lecture

	controls		
Unit-V	Air pollution	C-29	Lecture
Unit-V	Water pollution	C-30	Lecture
Unit-V	Soil and noise pollution	C-31	Lecture
Unit-V	Nuclear hazards and human health risks	C-32	Lecture
Unit-V	Solid waste management	C-33	Lecture
Unit-V	Control measures of urban and industrial waste.	C-34	Lecture
Unit-V	Pollution case studies.	C-35	Lecture
Unit-V	Clarification Class	C-36	Clarification Class
Unit-VI	Climate change, global warming, ozone layer depletion, acid rain and impacts on human Communities and agriculture	C-37	Lecture
Unit-VI	Environment Laws: Environment Protection Act; Air (Prevention & Control of Pollution) Act; Water (Prevention and control of Pollution) Act; Wildlife Protection Act	C-38	Lecture
Unit-VI	Forest Conservation Act. International agreements: Montreal and Kyoto protocols and Convention on Biological Diversity (CBD).	C-39	Lecture
Unit-VI	Nature reserves, tribal populations and rights	C-40	Lecture
Unit-VI	human wildlife conflicts in Indian context.	C-41	Lecture
Unit-VI	Clarification Class	C-42	Clarification Class
Unit-VII	Human population growth: Impacts on environment, human health and welfare.	C-43	Lecture
Unit-VII	Resettlement and rehabilitation of project affected persons; case studies	C-44	Lecture
Unit-VII	Disaster management: floods, earthquake, cyclones and landslides	C-45	Lecture
Unit-VII	Disaster management: floods, earthquake, cyclones and landslides	C-46	Lecture
Unit-VII	Environmental movements: Chipko, Silent valley, Bishnois of Rajasthan	C-47	Lecture
Unit-VII	Environmental ethics: Role of Indian and other religions and cultures in environmental conservation.	C-48	Lecture
Unit-VII	Environmental communication and public awareness, case studies (e.g., CNG vehicles in Delhi).	C-49	Lecture
Unit-VII	Environmental communication and public awareness, case studies (e.g., CNG vehicles in Delhi).	C-50	Lecture
Unit-VII	Clarification Class	C-51	Clarification Class
Unit-VIII	Visit to an area to document environmental assets: river/ forest/ flora/fauna,	C-52	Activity
Unit-VIII	Visit to a local polluted site-Urban/ Rural/ Industrial/Agricultural.	C-53	Activity
Unit-VIII	Study of common plants, insects, birds and basic principles of identification.	C-54	Lecture
Unit-VIII	Study of common plants, insects, birds and basic principles of identification.	C-55	Lecture

Unit-VIII	Study of simple ecosystems-pond, river, Delhi Ridge, etc.	C-56	Lecture
	Class Room Assignment	C-57	Class Room Assignment
	Activity	C-58	Activity
	Presentation	C-59	Presentation
	Activity	C-60	Activity

SEC077002– Ability & Skill Enhancement – II

Unit	Particulars	Class No.	Pedagogy of Class
Unit-I	Phonetic symbols and the International Phonetic Alphabets (IPA)	C-1	Lecture
Unit-I	The Description and Classification of Vowels (Monophthongs & Diphthong)	C-2	Lecture
Unit-I	Consonants	C-3	Lecture
Unit-I	Phonetic Transcription & Phonology	C-4	Lecture
Unit-I	Syllable	C-5	Lecture
Unit-I	Stress & Intonations	C-6	Lecture
Unit-I	Reading aloud, recording audio clips	C-7	Class Assignment
Unit- II	Idioms and Phrases	C-8	Lecture
Unit- II	Words Often Confused	C-9	Lecture
Unit- II	One word Substitution	C-10	Lecture
Unit- II	Word Formation: Prefix & Suffix	C-11	Lecture
	Home Assignment		Home Assignments
Unit-III	What are ethics, what are values, difference between ethics and morals	C-12	Lecture
Unit-III	Business ethics, workplace ethics,	C-13	Lecture
Unit-III	what are virtues for e.g. civic virtues, etc. Human ethics and values- 5 core human values are: right conduct, living in peace, speaking the truth, loving and care, and helping others.	C-14	Lecture
Unit-III	Etiquette awareness	C-15	Lecture
Unit-III	Importance of First Impression, Personal Appearance & Professional presence, Personal Branding	C-16	Lecture
Unit-III	Dressing Etiquette	C-17	Lecture
Unit-III	Dining Etiquette	C-18	Lecture
Unit-III	Presentation	C-19	Presentation
Unit-III	Clarification Class	C-20	
Unit-IV	Reading Comprehension	C-21	Activity
Unit-IV	News Reading	C-22	Activity
Unit-IV	Picture Description	C-23	Activity
Unit-IV	Paragraph Writing	C-24	Lecture
Unit-IV	Paragraph Writing	C-25	Activity
Unit-IV	News Writing	C-26	Lecture
Unit-IV	Clarification Class	C-27	Lecture
Unit -V	Public Speaking/Debate	C-28	Lecture
Unit -V	Debate	C-29	Class Assignment
Unit -V	Inspirational Movie Screening	C-30	Activity
Unit -V	Skit Performance	C-31	Activity
	Workshop		Workshop

Note: The review of Syllabus happens on periodic basis for the benefit of the students. In case there are changes in curriculum due to review, students would be intimated in writing.

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